FILE COPY FOREST INSECT LABORATORY, STANFORD UNIVERSITY CALIFORNIA.

425. Db10

REPORT ON EXPERIMENT CONDUCTED TO DETERMINE THE RELATIONSHIP OF BARK AND AIR TEMPERATURES.

Experiments conducted at the Palo Alto station having proved that the over wintering larvae of Dendroctonus brevicomis could be destroyed in the bark by certain low temperatures, it was thought advisable to test out this experiment in the field by a comparison of bark temperatures with the corresponding air temperature. In cooperation with the Palo Alto station an experiment to determine the relationship of bark and air temperature was started at this station on December 14, 1926.

Considerable difficulty was encountered in securing suitable equipment for this work. Thermometers of the glass rod type reading to or below zero could not be obtained locally and had to be ordered from the factory in the East and were not received in time for the December of January readings. Small house thermometers, removed from outer frames, were used for the bark temperatures and a reliable maximum and minimum thermometer for the air temperature. The bark thermometers were carefully tested and a correction factor applied to readings where necessary. The site selected for the experiment was chosen for its accessibility and affording the required D. brevicomis tree and green yellow pine check tree. Due to the fact that the trees were located on an open bench on top of a hill 400 feet higher in elevation than the lake level it was believed that it would be a colder location than the one used for the climatological data for this locality. In placing the thermometers in the trees a section

of bark 6X8 inches was removed from the north and south exposures of both the infested and green trees, breast high and using a ratchet brace and small bit, holes were bored vertically in bark as near cambium as possible. The thermometers were placed in the holes to the zero reading and the vacant space carefully packed with dry bark dust. A small vertical groove was cut in inner portion of bark removed, this piece being used as a cover for exposed portion of thermometer. All interstices were packed with cotton which was carefully replaced after each reading.

The first available cold spell began December 13, 1926. Hourly readings from 8 a.m. to 5 p.m. were taken on December 14th and 15th. The weather moderated on the 16th and the experiment was discontinued. The next drop in temperature occurred on January 20, 1927. Hourly readings from 8 a.m. to 5 p.m. were taken on January 21st and 22nd. The cold wave passed on the 23rd. In checking up the minimum air temperature recorded in the locality used for the experiments with the minimum reading made by the weather observer two miles distant on a lower level it was found that the site chosen was 10 degrees warmer. To avoid any possibility of error in equipment the maximum and minimum thermometer used in the experiment was checked with the Government thermometer for several days and found to be correct. While the readings secured at the experiment site give the range and comparison of temperatures for that location, it is believed lower bark temperatures can be obtained in other locations which will be tested out at the first available opportunity with the new equipment which has arrived.

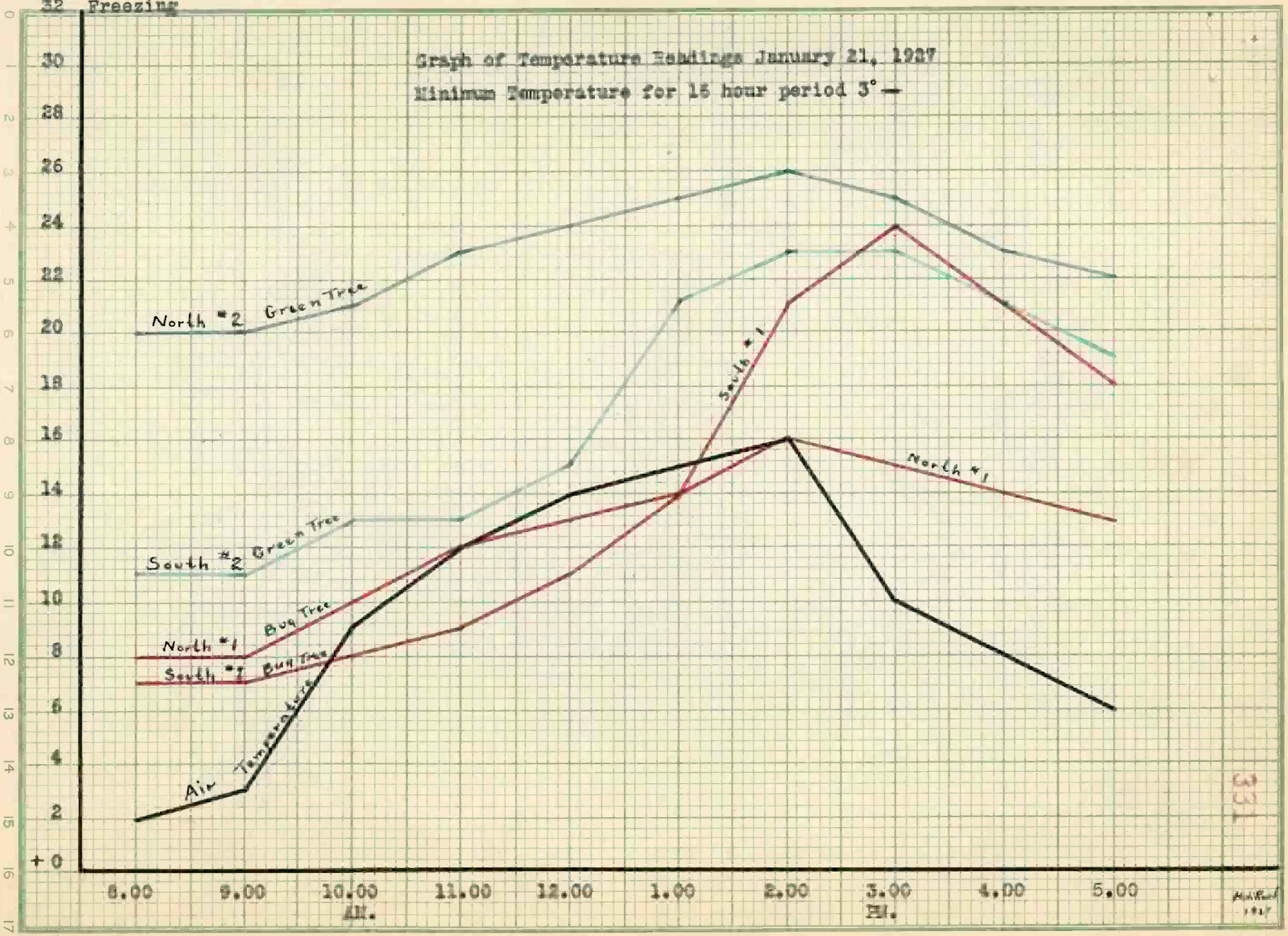
The hourly readings for December 14th and 15th and January 21st and 22nd are described by graphs.

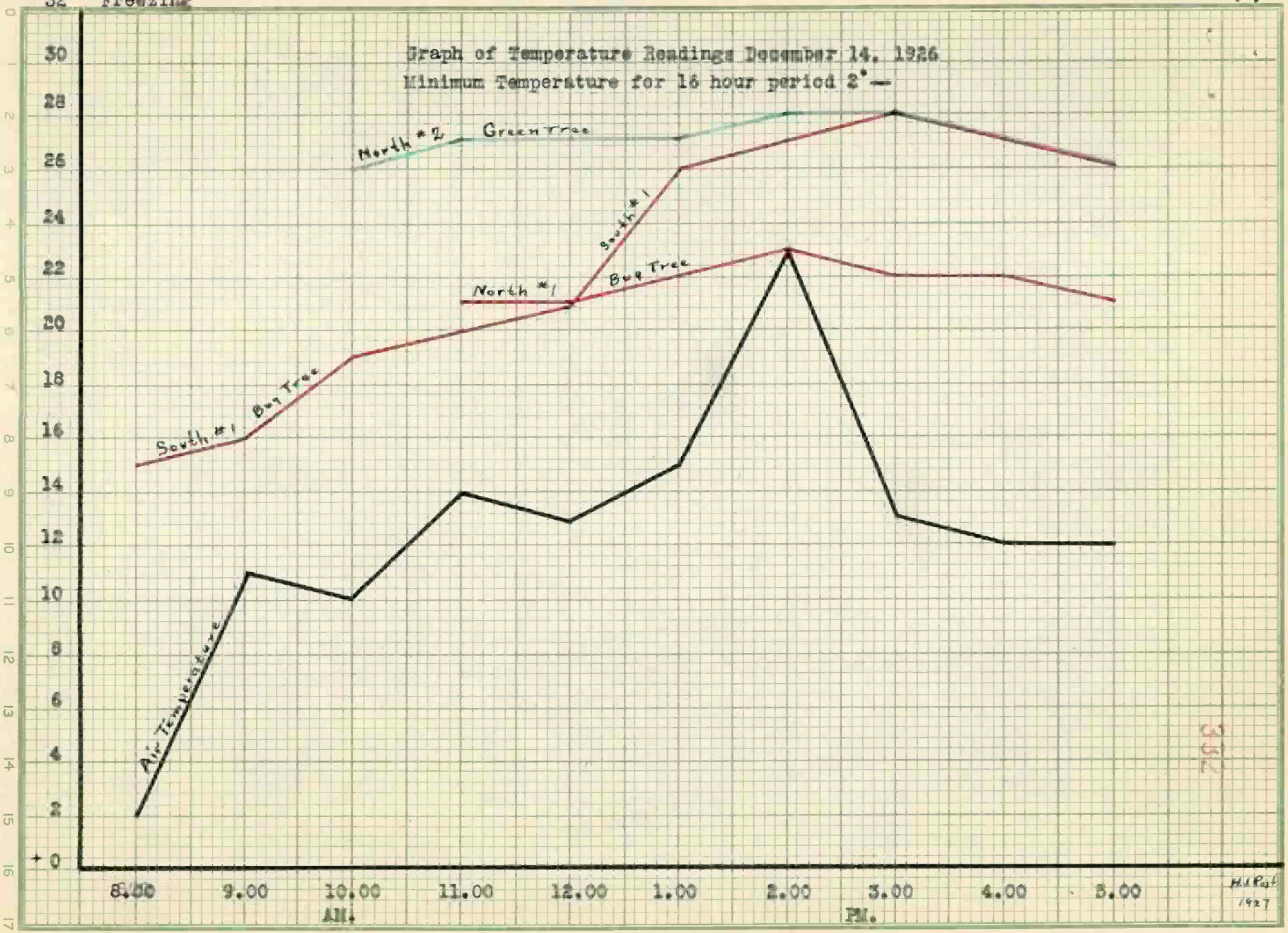
Respectfully submitted.

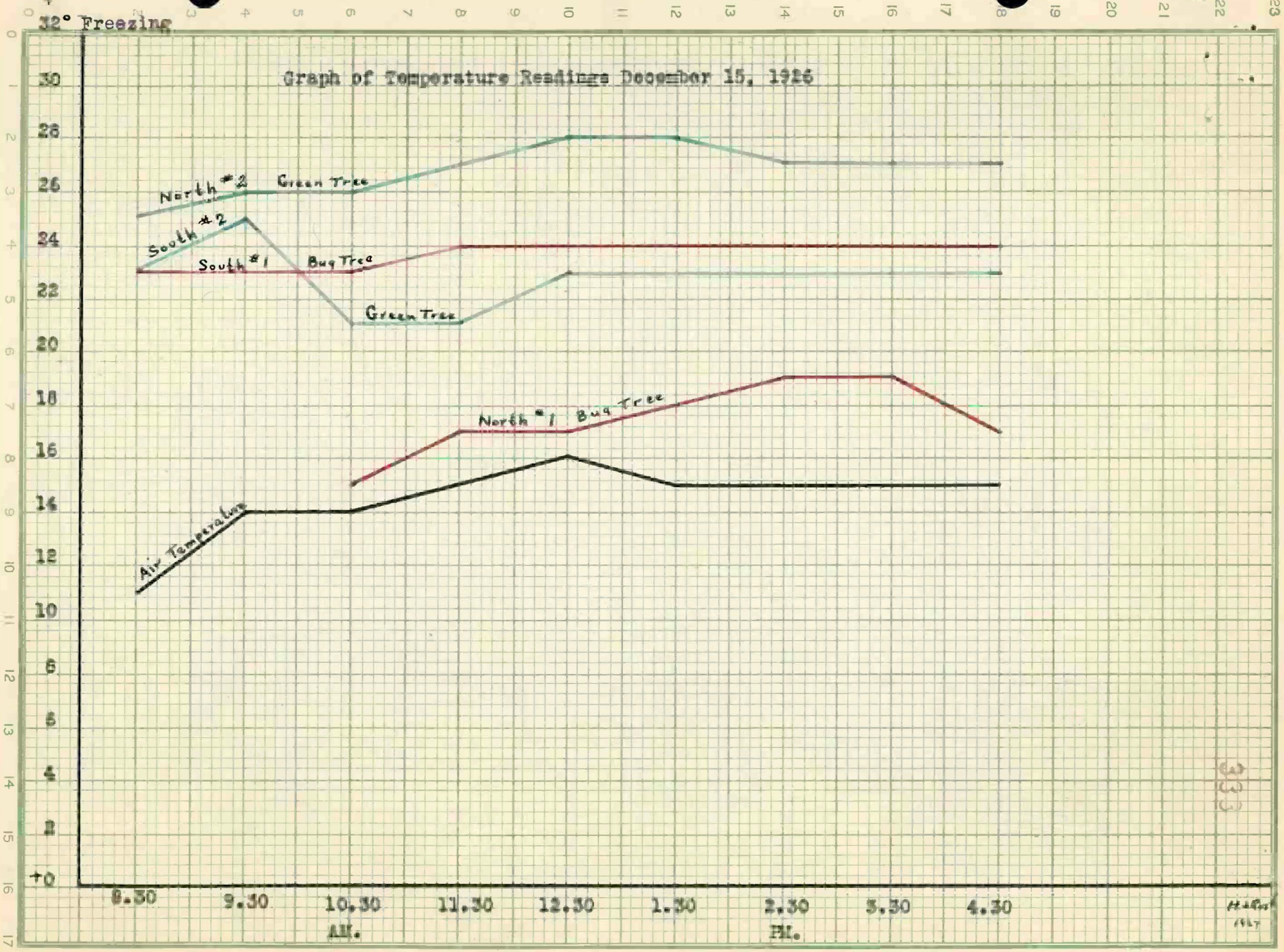
Henry J. Rust

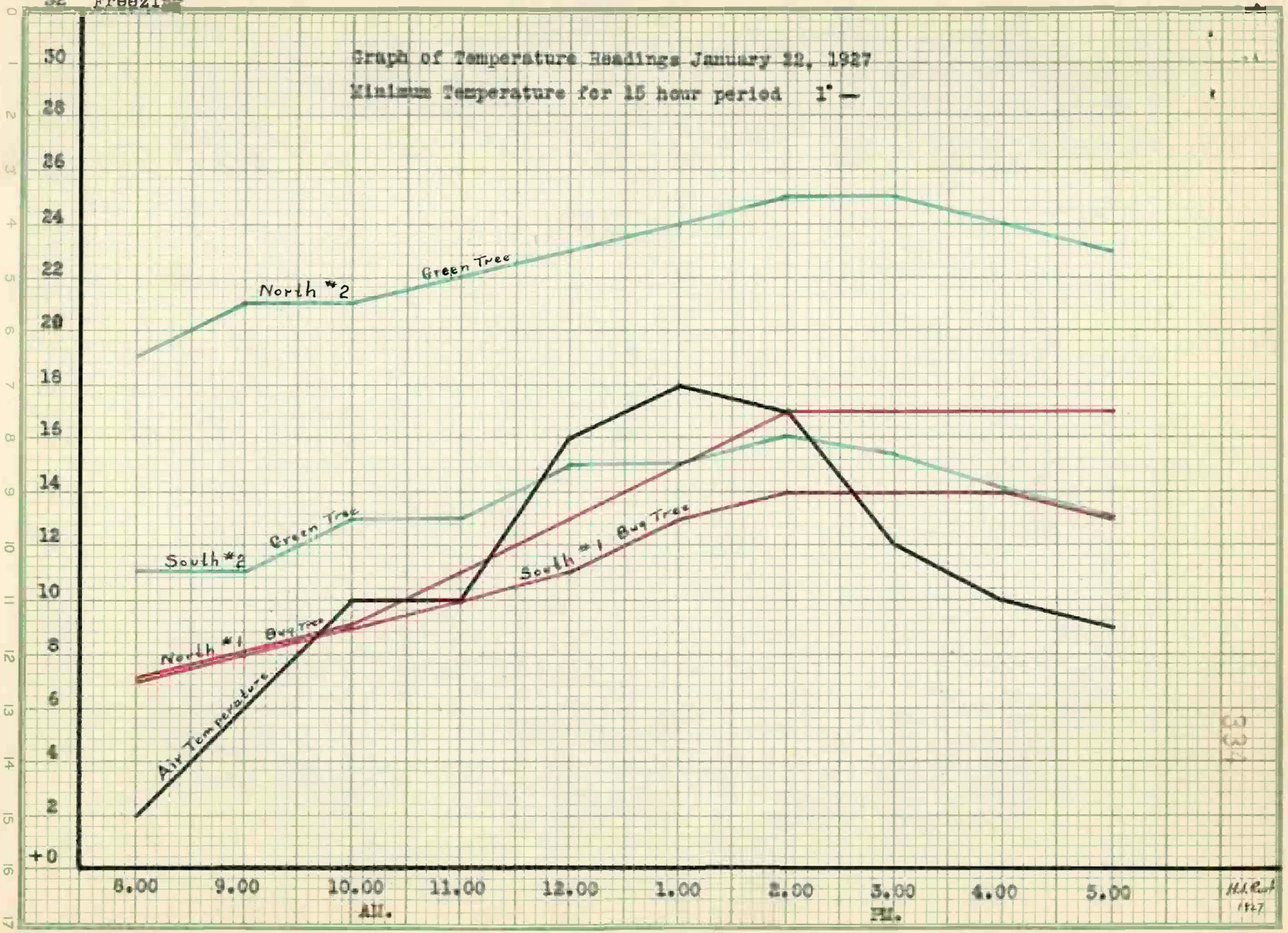
Henry J. Rust
Senior Scientific Aid.

Forest Insect Field Station
Coeur d'Alene, Idaho.


F
32° Freezing
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
+ 0
Graph of Temperature Readings January 21, 1927
Minimum Temperature for 15 hour period 3°—
North #2 Green Tree
South #2 Green Tree
North #1 Bug Tree
South #1 Bug Tree
Air Temperature
South #1
North #1
8.00
9.00
10.00 AM.
11.00
12.00
1.00
2.00
3.00 PM.
4.00
5.00


32° Freezing
Graph of Temperature Readings December 14, 1926
Minimum Temperature for 16 hour period 2°—
North #2
Green Tree
South #1
Bud Tree
North #1
South #1
Bud Tree
Air Temperature
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
+ 0
8.00
9.00
10.00
A.M.
11.00
12.00
1.00
2.00
3.00
P.M.
4.00
5.00
H.U.Prof
1927


32° Freezing
Graph of Temperature Readings December 15, 1926
North #2 Green Tree
South #2
South #1 Bug Tree
Green Tree
North #1 Bug Tree
Air Temperature
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
+0
8.30
9.30
10.30
AM.
11.30
12.30
1.30
2.30
PM.
3.30
4.30


32° Freezing
Graph of Temperature Readings January 12, 1927
Minimum Temperature for 15 hour period 1°—
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
+0
North #2
Green Tree
South #2
Green Tree
North #1
Bug Tree
South #1
Bug Tree
Air Temperature
8.00
9.00
10.00
A.M.
11.00
12.00
1.00
2.00
3.00
P.M.
4.00
5.00